

Remarks

Claims 1-14 are pending after entry of this amendment. Claim 14 was added herein, and claims 1 and 11 were amended herein. Neither newly added claim 14 or the amendments to claims 1 and 11 added new matter. The amendments to claims 1 and 11 were meant to more fully clarify the invention. Favorable reconsideration is respectfully requested in view of the amendments and remarks offered herein.

The Examiner requested that the entire specification be re-read and presented in more fluent English/better form wherever necessary. Applicant has done this and presented, as suggested by the Examiner, a substitute specification in accordance with MPEP § 608.01(q). Applicant has amended page 14, line 1, as requested by the Examiner, but did not amend the claims, so that they are those presented with the original application. However, the abstract was amended to address the Examiner's concerns. Applicant asserts that the substitute specification does not contain new matter. Applicant respectfully asserts that the substitute specification address the Examiner's concerns and requests that this objection be withdrawn in light thereof.

The Examiner rejected claims 1-10 under 35 U.S.C. § 112, second paragraph. Applicants respectfully traverse this rejection.

The Examiner rejected claims 11-13 under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Smuck et al. Applicants respectfully traverse this rejection.

The Examiner rejected claims 1-10 under 35 U.S.C. § 103(a) as being unpatentable over Sumitomo in view of Sandt. Applicants respectfully traverse this rejection.

35 U.S.C. § 112 Rejection

The Examiner rejected claims 1-10 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Applicants respectfully traverse this rejection.

Specifically, with respect to claim 1, the Examiner suggested that the phrase "a continuous process" in line 7 be changed to "conducted continuously"; and "where" in line 7 be changed to "whereby". Applicant thanks the Examiner for these suggestions

and has incorporated them into the claims. Also with respect to claim 1, the Examiner asserts that there is neither any prior mention/antecedent basis nor reemergence for the terms "a partial length" and the "preceding partial length". Applicants have amended claim 1 to provide prior mention/antecedent basis for the terms and clarify what they refer to. Further with respect to claim 1, the Examiner asserts that claim 1 is incomplete, i.e., it failed to recite either the laminating conditions (i.e., P, T) or that the cooling step in Applicant's envisioned process is conducted under high pressure. Applicant has amended claim 1 to include the temperature and pressure of laminating. Further, Applicant asserts that claim 1 already specified that the cooling was conducted under pressure, see line 9 of claim 1 which was previously included in the claim.

Applicant respectfully asserts that these amendments to claim 1 have overcome the rejection under 35 U.S.C. § 112, and therefore respectfully request that the rejection be withdrawn.

35 U.S.C. § 102 or 103 Rejections

The Examiner rejected claims 11-13 under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Smuck et al. The Examiner asserts that Smuck discloses a laminating apparatus composed of a heated roller pair/couple and a cooled/cooling roller pair/couple. The Examiner also specifically states that Smuck et al. fairly and clearly provide for control of both the pressure and heat (or cooling) applied by their two roller pairs or couples, such that it would have been obvious to one of skill in the art to effect the cooling regimen set forth in the "wherein" clause in the last two lines of [claim 11], this controlled apparatus being seen to be capable of performing this cooling regimen. Applicant respectfully disagrees with the Examiner regarding the extent of the teaching of Smuck.

Applicant respectfully asserts that Smuck does not teach an apparatus that laminates the woven material with the PTFE foil or the ePTFE foil at approximately 380° C to 400° C under a pressure of 0.1 to 20 N/mm² as is recited in claim 11. Applicant respectfully asserts that nowhere in Smuck is it disclosed that the apparatus laminates at these temperatures. Smuck only discloses that the lamination occur at a temperature

between 150° C and 250° C, page 13, lines 7-8 (translation). Therefore, Smuck does not disclose all of the elements recited in claim 11, and does not anticipate claim 11.

Similarly, Smuck does not render claims 11-13 obvious because it does not suggest the claimed invention. Smuck does recite that supplementary radiation-heating units can be installed between the heating and cooling rollers, but does not suggest that such supplementary units could result in a doubling of the laminating temperature. Furthermore, Smuck does not disclose that temperatures that are twice as high would have any advantage. Therefore, Applicant asserts that Smuck does not anticipate nor make obvious the claimed invention.

Applicant also asserts that, although Smuck discusses cooling rollers with pressing forces from 100 to 400 kg per cylinder (page 13, lines 12-14 translation), Smuck does not utilize pressures as high as that of the Applicant's invention and does not suggest that high pressures would result in an advantage. In fact, Smuck teaches against the use of high pressures. Smuck discusses one example of prior art, DE 3,719,976 and notes on page 2, lines 1-5 (translation) that the need in the prior art, for the use of a plunger results in the disadvantage that pressure is thereby applied to the article to be layered, which makes it impossible for this article to be thin, because it would then be distorted. This disadvantage is described in more detail at page 5, lines 17-27 (translation). Specifically, Smuck states that the application of pressure toward the layer of material to be processed, results in the disadvantage that the material is deformed by thermoplastic distortion, for example, gives way in width and in length or even without coordination, which leads to impairment of dimensional accuracy (repeatability). This application of pressure is again discussed at page 6, lines 6-10 (translation) where it is stated that such application of pressure is avoided in the invention.

During the discussion with regard to Figure 4, it is stated that "important is the fact that no pressing force is exerted upon the laminate 36 by the heating and cooling zones" (page 14, lines 20-22 translation). Therefore, Applicant asserts that one of skill in the art would not have been motivated to modify Smuck to use the high pressures that Applicant utilizes because Smuck teaches against such pressures.

The Examiner rejected claims 1-10 under 35 U.S.C. § 103(a) as being unpatentable over Sumitomo in view of Sandt. The Examiner asserts that Sumitomo

discloses that it is known to melt-adhere a PTFE film to a woven glass fabric in a heat and pressure lamination process. The Examiner also asserts that Sandt discloses that it is preferred to cool the laminate under pressure by maintaining laminated pressure, such that it would have been obvious to one of skill in the art to employ this preferable cooling under pressure in conjunction with the process of Sumitomo.

Applicant respectfully asserts that even given the teachings of Sandt and Sumitomo, one of skill in the art would not have been motivated to obtain Applicant's invention. Sumitomo specifically discloses that "in order to prevent the warping and the bending of the sheet, said sheet is preferably gradually cooled after a sintering has been completed" (page 3, lines 15-17). Sumitomo specifically discusses a gradual cooling. Sandt does not modify this teaching. Specifically, Sandt discloses at column 1, lines 38-40 that cooling is done gradually so as to minimize the chance for bond rupture as a result of unequal contraction of the assembly during this step (also see column 3, lines 1-3). Also, neither Sumitomo or Sandt disclose or suggest cooling to about 50° C. Sumitomo does not give a specific final temperature of the cooling, and Sandt discusses cooling under pressure to below 280° C (column 3, lines 41-45), or in air to below 300° C (col. 4, lines 12-15). Both Sumitomo and Sandt teach that the cooling is gradual and does not go down to between 300° to 280° C. Therefore, these disclosures would not motivate one of skill in the art to utilize a cooling step from about 300 to 420° C to about 50° C in 0.1 to 240 seconds.

Applicant respectfully asserts claims 1-10 are not obvious in view of Sumitomo and Sandt, and respectfully request that this rejection be withdrawn.

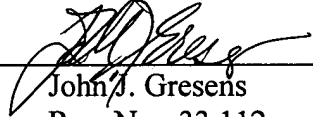
Conclusion

In view of the amendments and comments presented herein, favorable reconsideration in the form of a Notice of Allowance is respectfully requested.

Respectfully submitted,

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Marked up version of Claims

In the Claims

Please amend claims 1 and 11 as follows.

1. (Thrice Amended) A method of manufacture of a composite product comprising at least one layer of reinforcing woven material and at least one layer of PTFE foil or ePTFE foil[,] comprising the steps of:

laminating [wherein] said at least one layer of foil [is laminated] together with said at least one layer of woven material by heat and pressure, to form a laminated foil and woven material having a partial length and a preceding partial length, wherein said laminating is carried out at approximately 380° C to 400° C under a pressure of 0.1 to 20 N/mm²; and

cooling said laminated foil and woven material [the composite material is subsequently cooled] in a fully or partly fixed state, wherein said [composite material] laminated foil and woven material is cooled under pressure, from about 300 to 420 ° C to about 50 ° C in about 0.1 to 240 seconds, [and]

wherein said [heating] laminating and cooling is [a continuous process] conducted continuously whereby cooling of [a] said partial length of said laminated foil and woven material is carried out simultaneously with the heating of [the] said preceding partial length of said laminated foil and woven material.

11. (Thrice Amended) An apparatus for manufacture of a composite material comprising at least one layer of reinforcing woven material and at least one layer of PTFE foil or ePTFE foil, where said at least one layer of foil is laminated together with said at least one layer of woven material by heat and pressure, said apparatus comprising:

means for laminating said at least one layer of reinforcing woven material and said at least one layer of foil together, wherein said at least one layer of foil is laminated together with said at least one layer of woven material [by heat and pressure, as the apparatus comprises] at approximately 380° C to 400° C under a pressure of 0.1 to 20 N/mm² wherein said means for laminati[on]g [of the composite] said at least one layer

of reinforcing woven material and at least one layer of PTFE foil or ePTFE foil [by]
comprises a combined pressure and heat supply; [, wherein the apparatus further
comprises]

means for fixation of the uncooled or partly cooled [composite] laminated at least
one layer of reinforcing woven material and at least one layer of PTFE foil or ePTFE foil;
and

a controllable culling means,

wherein said fixation means cooperates with [a] said controllable cooling means,
wherein said apparatus is suitable for cooling said composite material under pressure
from about 300 to 420° C to about 50° C in about 0.1 to about 240 seconds.

